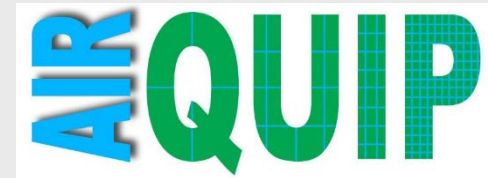




Norwegian
Meteorological
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Progress on *u*EMEP

Bruce Rolstad Denby, Peter Wind, Hilde Fagerli
Matthieu Pommier, Michael Gauss

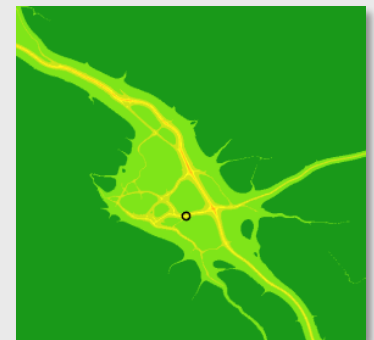
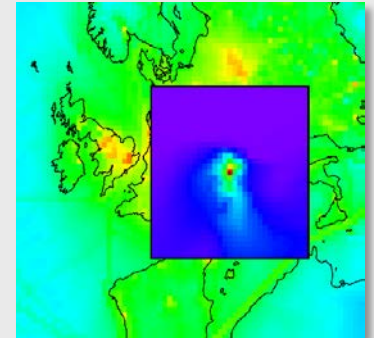
Tallinn, 28 June 2018

Workshop on local measures to improve air quality and health

*u*EMEP

*u*EMEP (urban EMEP) consists of two parts

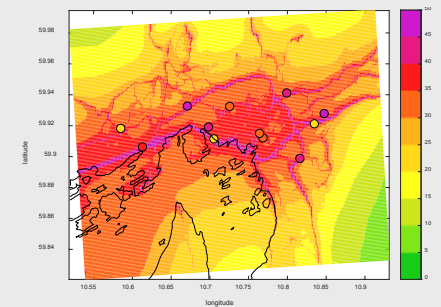
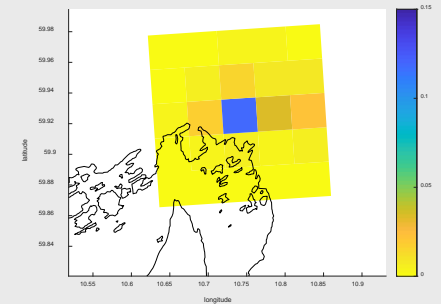
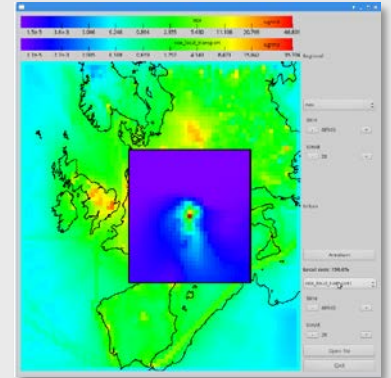
- A method for calculating the local contribution of emission sources to the gridded concentrations, known as **local fraction** (*lf-u*EMEP)
- A method for **downscaling** the local fraction contribution from EMEP to high resolution sub-grids of ~50 m. Achieved by **redistribution** or **replacement** of emissions and Gaussian dispersion modelling (*ds-u*EMEP)



Can be applied on both hourly and annual data and at all EMEP resolutions

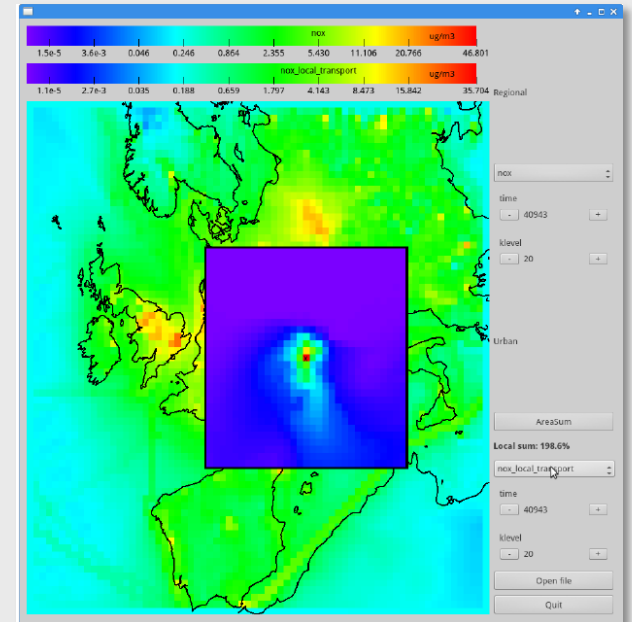
Local fractions in EMEP (*If-u*EMEP)

- Built into the EMEP model, fluxes are followed through the model domain to the surrounding grids (i.e. not parameterized, but calculated at each timestep: emis., adv., diff., dep., chem.)
- With this we know the fractional contribution to each grid from all the neighbouring grids, e.g. 5 x 5 or 20 x 20 surrounding grids
- Knowing this we can calculate source contributions to or from the surrounding grids, and/or use this information to downscale only the local source contribution within an EMEP grid

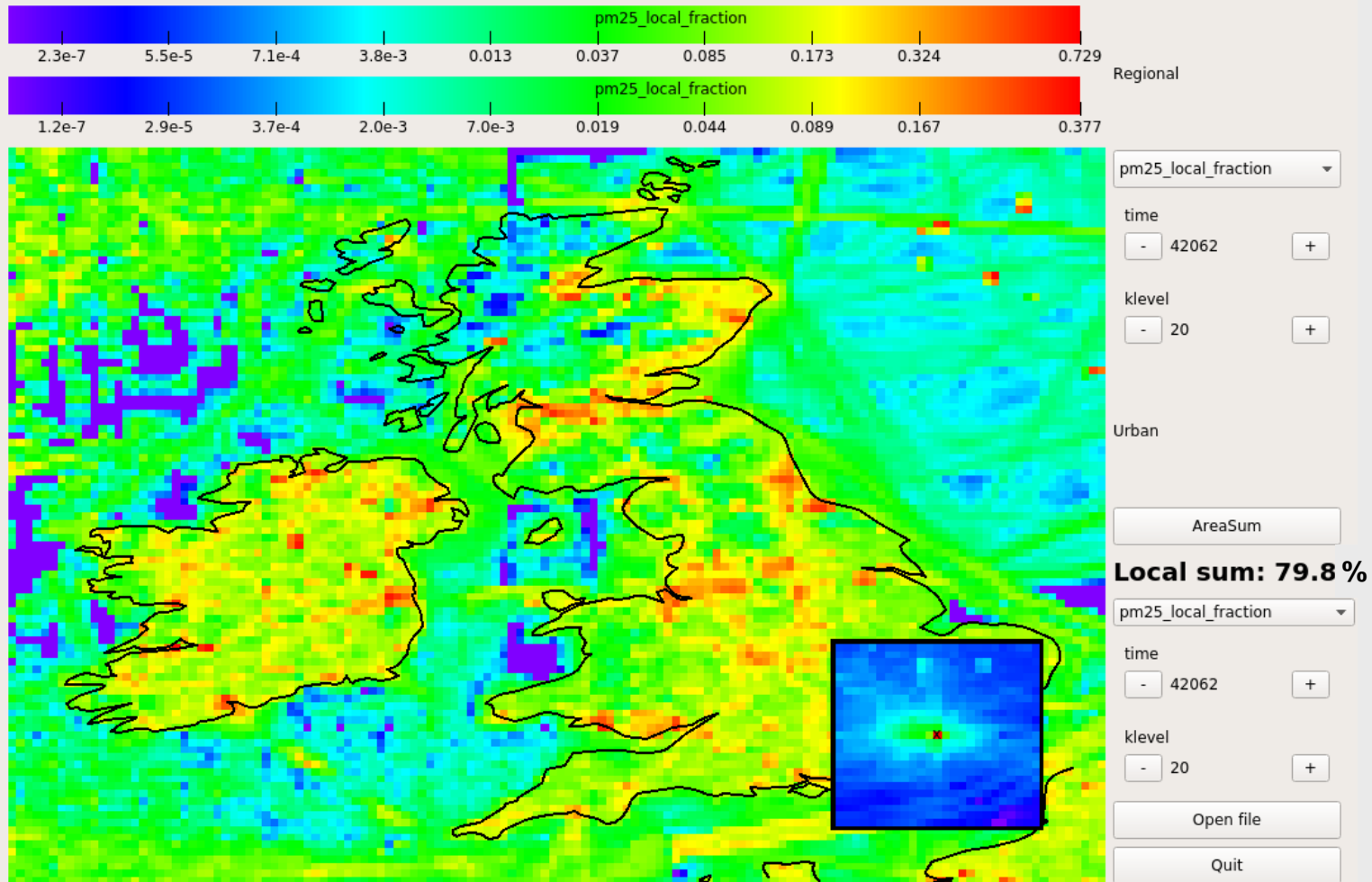


Application in the 'twin site' study

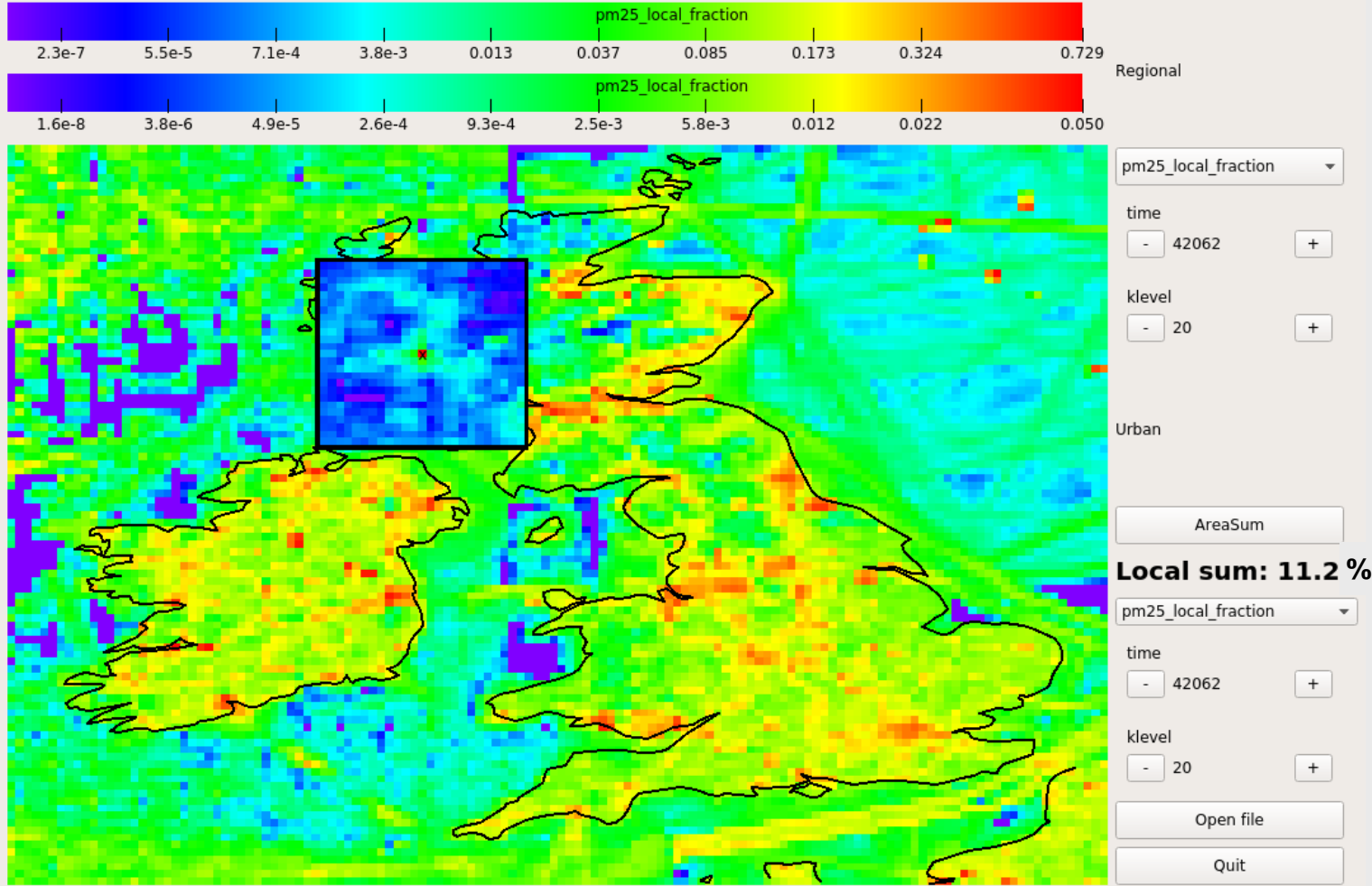
- The local fraction calculation (*lf-u*EMEP) can be used to directly calculate the city contribution from primary emissions to the region surrounding the city as well as the nearby contribution to a city
- Can be used now, everywhere
- Does not provide, as yet, an estimate for secondary components (ozone, SOA, ...)



The local fractions visualization tool



The local fractions visualization tool



Conclusions

- Local fractions is a “bi-product” of uEMEP, which is built into the EMEP model
- It is based on detailed flux calculations for each model grid cell
- In theory the method corresponds to a tagging method: the pollutants from different origins are tagged, i.e. their value are stored individually
- It is computationally efficient as only one model run is needed to calculate local fractions for all grid cells (but it requires large memory and thus parallel computing is an advantage)
- For now it works only for primary components
- Visualization tool reads large amounts of data, which also is demanding → web tool not available yet.